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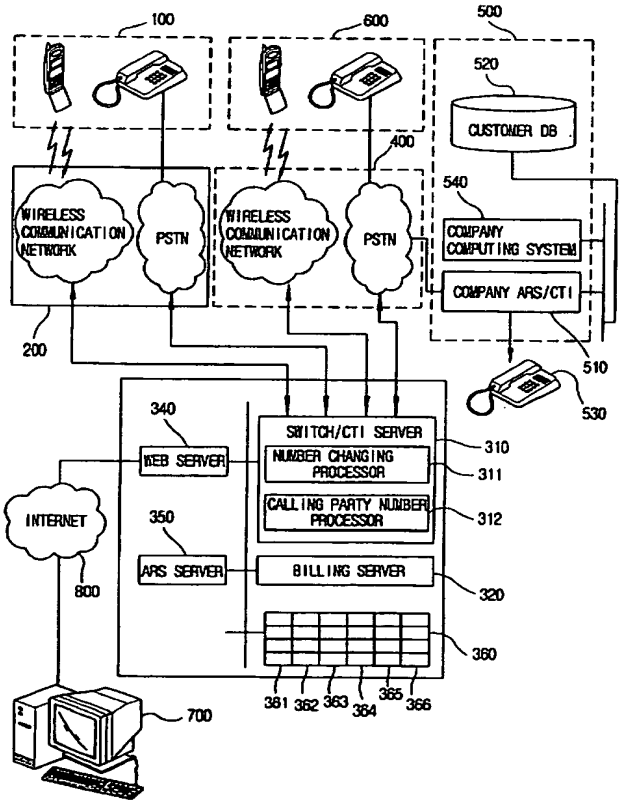

(57) Abstract: A virtual telephone number service method for providing call and multiple telephone number services by using virtual telephone numbers and a system thereof are disclosed. The method includes the steps of a) assigning one virtual telephone number or more to each of real telephone numbers, b) detecting a real telephone number associated with a virtual telephone number when a call is made by the virtual telephone number, and c) establising the call according to the real telephone number.

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VIRTUAL TELEPHONE NUMBER SERVICE METHOD AND SYSTEM

TECHNICAL FIELD

The present invention relates to a method of servicing a virtual telephone number and a system thereof, more particularly to a method that can provide a call receiving service and a multiple telephone number service using virtual telephone numbers and a system thereof.

BACKGROUND ART

It is common to change a telephone number to protect one's privacy. When the telephone number is changed, a problem arises due to loss of communication with people of intimacy or business. Further, because the changed telephone number may be exposed anytime, it is inconvenient to continually change the telephone number.

Conventionally, providers operate a telephone service center or an ARS system. When the telephone service center receives a call from a customer, a service guider of the telephone service center asks the caller about the customer information, for example, a customer number, an account number or a resident registration number. However, since the customer information is delivered by voice as its voice, there arises an error in delivering the customer information. Further, in the ARS system, the plurality of keys are selected for identifying the customer, so that it takes much more time to identify the customer than to provide services to the customer.

In the prior art, calling party numbers have been used to resolve these problems, but this method has problems as follows:

1. When a customer uses a telephone which is not registered, the customer cannot be identified with the telephone number;

2. When a telephone number of a customer is changed, the customer has to change his information by himself; and

3. When a customer uses an Internet phone for call, it is impossible to identify a real calling party, because a telephone number of a VoIP switching apparatus is received as a calling party number.

DISCLOSURE OF INVENTION

One object of the present invention is to provide a method of providing a virtual telephone number service and a system thereof which can provide a call service using virtual telephone numbers without exposure of real telephone numbers.

Another object of the present invention is to provide a method of providing a virtual telephone number service and a system thereof which can allow a called party to identify a calling party without regard to any telephone used by the calling party.

In order to achieve the above objects, a method of providing a virtual telephone number service according to the one aspect of the present invention comprises the steps of: a) assigning at least one or more virtual telephone numbers to at least one or more real telephone numbers, respectively; b) detecting a real telephone number to which a virtual telephone number is assigned when the virtual telephone number is dialed for a call; and c) establishing the call according to the real telephone number detected by the step b). The at least one or more virtual telephone numbers include a service identification number, respectively. Further, the method further comprises the steps of: d) determining whether the dialed virtual telephone number is a call rejecting number; and e) providing a call rejected message to a calling party when the dialed virtual telephone number is a call rejecting number. Preferably, the method further comprises the steps of: f) receiving a request to vary a virtual telephone number; and g) converting the virtual telephone number into an idle virtual telephone number. Preferably, the method as claimed in claim 1, further comprises the step of: h) converting a telephone number of the calling party into the called virtual telephone number, when performing the step c).

According to another aspect of the present invention, a system for providing a virtual telephone number service comprises: a database for including at least one or more real telephone numbers, to each of which at least one or more virtual telephone numbers are assigned; and a switching/CTI server for detecting a real telephone number to which a virtual telephone number is assigned when the virtual telephone number is dialed for a call and for establishing the call according to the detected real telephone number. The database includes a call rejecting field assigned to each of the at least one or more virtual telephone numbers, and the switching/CTI server generates call rejected message when a call rejecting field of the dialed virtual telephone number is activated

and provides the call rejected message to a calling party which had dialed the virtual telephone number. Further, the database includes available term fields, each of which is assigned to respective one of the at least one or more virtual telephone numbers, and the switching/CTI server generates an available term exceeding message when an available term field of the dialed virtual telephone number is activated and provides the available term exceeding message to a calling party that dials the dialed virtual telephone number. Further, the database includes calling party number changing fields, each of which is assigned to respective one of the at least one or more virtual telephone numbers, and the switching/CTI server changes a calling party number to the dialed virtual telephone number when a calling party number field of the dialed virtual telephone number is activated, and provides the dialed virtual telephone number as the calling party number to a called party.

According to the present invention, because the subscribers receive calls through the virtual telephone numbers and not through the real telephone numbers, the subscribers can easily change or cancel the virtual telephone numbers, so that privacy of the subscribers is sufficiently protected. Furthermore, when a virtual telephone number of a called party is assigned to a particular person and when the virtual telephone number is provided to the called party as a calling party number, it is possible to confirm the calling party without regard to any telephone of the calling party.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view for showing a system which provides a virtual telephone number service according to one embodiment of the present invention.

FIGs. 2 and 3 are flowcharts for illustrating operation of the system depicted in FIG. 1.

BEST MODE FOR CARRYING OUT THE INVENTION

Preferred embodiments of the present invention will be illustrated below with reference to the accompanying drawings.

FIG. 1 is a view for showing a system which provides a virtual telephone number service according to one embodiment of the present invention.

Referring to FIG. 1, a system according to the present invention includes a switching/CTI server 310, which is connected with a wire/wireless communication network 200 and 400 and a database 360.

The database 360 includes a virtual telephone number field 361 and a real telephone number field 362. Real telephone numbers of customers are recorded on the real telephone number field 362. Virtual telephone numbers are recorded on the virtual telephone number field 361. The virtual telephone numbers include a service identification number, respectively. For example, the service identification number may be requested and assigned to and by a telephone number managing authority, such as MIC(Ministry of Information and Communication) of Republic of Korea. The virtual telephone numbers are stored in relation to the real telephone numbers. One or more virtual telephone numbers are assigned to one real telephone number. That is, according to the request of a customer, one or more virtual telephone numbers are assigned to one real telephone number. The database(360) includes call rejecting field 363. Call rejecting information for each of virtual telephone numbers is denoted at the call rejecting field 363. The database 360 includes calling party number changing field 364. It is denoted at the calling party number changing field 364 for all virtual telephone numbers whether a calling party number is changed to a virtual telephone number. The database 360 includes a customer number field 365. Numbers assigned to customers to whom the virtual telephone numbers are assigned, are recorded at the customer number field 365. The database 360 includes an available term field 366. Available terms of each virtual telephone number are recorded at the available term field 366.

When the switching/CTI server 310 receives a call requesting signal for requesting a call as a virtual telephone number is dialed, the switching/CTI server 310 searches the database 360 for a real telephone number of the dialed virtual telephone number and establishes the call according to the searched real telephone number. If the call rejecting field of the dialed virtual telephone number is activated, the switching/CTI server 310 generates a call rejected message and provides the call rejected message to the calling party which dialed the virtual telephone number. When a signal for requesting a change of a virtual telephone number is inputted to the switching/CTI server 310 through a communication network such as Internet or ARS(Audio Response System), the switching/CTI server 310 changes the requested virtual telephone number stored in the database 360 to one of the idle virtual telephone numbers.

Further, when the switching/CTI server 310 receives a signal for requesting a call of a virtual telephone number, the switching/CTI server 310 determines whether the available term of the virtual telephone number stored at the available term field expires. When the available term of the virtual telephone number had expired, the switching/CTI server 310 generates a term expired message and provides the term expired message to a calling party which requests the call. To the contrary, when the available term does not expire, the switching/CTI server 310 establishes the call. When the calling party number changing field 364 of the virtual telephone number is activated, the switching/CTI server 310 changes a calling party number to the virtual telephone number. And, when the call is established, the switching/CTI server 310 provides the virtual telephone number to a called party 500 as the calling party number.

Preferably, the system further comprises a billing server 320, a web server 340, and an ARS server 350. The billing server 320 charges for calls according to a call specific of each customer and stores the charged fee and the call specific.

The web server 340 advertises the present service and receives application for the service through the Internet. Further, the web server 340 provides information concerning the present service to customers. Customers connected with the web server 340 through the Internet can apply for the present service according to information provided from the web server 340 and can set up the fields of the database 360 through the web server 340.

The ARS server 350 guides customers through the telephone. Customers can apply for the present service by using the telephone according to a guidance of the ARS server 350. Further, the customers can set up the fields of the database 360 through the ARS server 350.

The present invention will be described below in detail with reference to drawings attached hereto.

FIGs. 2 and 3 are flowcharts for illustrating operation of the system depicted in FIG. 1.

Referring to FIGs. 2 and 3, real telephone numbers of subscribers subscribed to the virtual telephone number service are stored in the database 360. Information concerning services requested by each subscriber is inputted to the fields of the database 360. For example, as shown in table 1 below, the database 360 includes the virtual telephone number field 361, the real telephone number field 362, the call rejecting field

363, the calling party number changing field 364, the customer number field 365, and the available term field 366. The customers' information is preferably stored at any other database than the database 360 according to the customer numbers(S1 and S2).

Table 1

Virtual telephone number	Real telephone number	Call rejection	Calling party number changing	Customer number	Term
050-9911-0001	02-234-3455	No	No	A	2001.4.1 - 2002. 6.31
050-9911-0002	02-234-3455	Yes	No	B	Don't care
050-9911-0003	011-111-1111	No	Yes	C	Don't care
050-9911-0004	Idle				

When a calling party dials a telephone number "YYY-XXXX-XXXX" using a wireless or wire terminal 100, a switching center of wire/wireless networks, at which the calling party is positioned, provides the call request to the switching/CTI server 310 according to the service identification number "YYY" (for example, "050") included in the dialed telephone number. When the call request is inputted to the switching/CTI server 310, the switching/CTI server 310 inquires the database 310 about service fields of the virtual telephone number("050-XXXX-XXXX")(S3 and S4).

When the virtual telephone number is not used (for example, "050-9911-0004" in Table 1), the switching/CTI 310 generates an idle number message of informing the fact that the virtual telephone number does not exist and provides the idle number message to the calling party 100(S5 and S6).

When the virtual telephone number is used and when the virtual telephone number is a call rejecting number(for example, "050-9911-0002" in Table 1), the switching/CTI server 310 generates a call rejecting message and provides the call rejecting message to the calling party 100(S7 and S8).

When the virtual telephone number is not a call rejecting telephone number, but setting up an available term (for example, "050-9911-0001"), the switching/CTI server

310 determines whether an available term of the virtual telephone number had expired. When the available term expires, the switching/CTI server 310 generates a term expired message and provides the message to the calling part 100(S9 and S10).

When the term does not expire, the switching/CTI server 310 establishes the call according to a real telephone number(02-234-3455). At this time, when the calling party number changing field of the virtual telephone number is disabled, the switching/CTI server 310 provides a telephone number of the calling party 100 to a called party 500 or 600 as a calling party number. To the contrary, when the calling party number changing field is enabled, the switching/CTI server 310 provides the virtual telephone number to the called party 500 or 600 as the calling party number(S11, S12, and S13).

When the virtual telephone number(for example, "050-9911-0003" in Table 1) is provided to the called party 500 as the calling party number, the called party 500 can know who the calling party is based on the virtual telephone number. For example, if the called party is an ARS/CTI 510 of a business company 500 which has a customer database 520 as denoted in Table 2 below, and if a calling party number for calling the ARS/CTI is "050-9911-0003", the ARS/CTI 510 queries the database 520 for a customer C of the calling party number "050-9911-0003". Therefore, the ARS/CTI 510 can immediately provide a suitable service to the customer C without a confirming process of the customer C.

Table 2

Customer Identification Number	Customer Number	Customer Name
050-9911-0001	1234	A
050-9911-0002	1235	B
050-9911-0003	1236	C

When the call is established, the database 360 stores the call specific and the fee for the call therein. To the contrary, when the call establishment is failed, the switching/CTI 310 generates a line busy message and provides the line busy message to the calling party 100(S14, S15, and S16).

When a subscriber is connected with the system 300 through his computer via the Internet 800 or through the wire/wireless telephone 100 via wire/wireless networks

200 in order to change the subscriber information or services, changing services of subscriber information or services are provided by the web server 340 or the ABS server 350, and changed information or services are stored in the database 360(S17 and S18).

According to the system, because the subscribers receive calls through the virtual telephone numbers and not through the real telephone numbers, the subscribers are easy to change or cancel the virtual telephone numbers, so that privacy of the subscribers is sufficiently protected. Furthermore, when a virtual telephone number of a called party is assigned to a particular person and when the virtual telephone number is provided to the called party as a calling party number, it is possible to confirm the calling party without regard to any telephone of the calling party.

While the invention has been described in terms of a preferred single embodiment, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the appended claims.

CLAIMS

1. A method of providing a virtual telephone number service comprising the steps of:

a) assigning at least one or more virtual telephone numbers to at least one or more real telephone numbers, respectively;

b) detecting a real telephone number to which a virtual telephone number is assigned when the virtual telephone number is dialed for a call; and

c) establishing the call according to the real telephone number detected by the step b).

2. The method as claimed in claim 1, wherein the at least one or more virtual telephone numbers include a service identification number.

3 The method as claimed in claim 2, further comprising the steps of:

d) determining whether the dialed virtual telephone number is a call rejecting number; and

e) providing a call rejected message to a calling party when the dialed virtual telephone number is a call rejecting number.

4. The method as claimed in claim 1, further comprising the steps of:

f) receiving a request to vary a virtual telephone number; and

g) converting the virtual telephone number into an idle virtual telephone number.

5. The method as claimed in claim 4, wherein the step f) is performed by using an ARS or through Internet.

6. The method as claimed in claim 1, wherein the at least one or more virtual telephone numbers have available terms, respectively.

7. The method as claimed in claim 1, further comprising the step of:

h) converting a telephone number of the calling party into the called virtual telephone number, when performing the step c).

8. The method as claimed in claim 7, further comprising the step of assigning each of the at least one or more virtual telephone numbers to customers, and constructing a database for storing information of the customers according to the at least one or more virtual telephone numbers.

9. A system for providing a virtual telephone number service comprising:

a database for including at least one or more real telephone numbers, to each of which at least one or more virtual telephone numbers are assigned; and

a switching/CTI server for detecting a real telephone number to which a virtual telephone number is assigned when the virtual telephone number is dialed for a call and for establishing the call according to the detected real telephone number.

10. The system as claimed in claim 9, wherein the at least one or more virtual telephone numbers include a service identification number.

11. The system as claimed in claim 9, wherein the database includes call rejecting fields assigned to each of the at least one or more virtual telephone numbers, and the switching/CTI server generates call rejected message when a call rejecting field of the dialed virtual telephone number is activated and provides the call rejected message to a calling party, which had dialed the dialed virtual telephone number.

12. The system as claimed in claim 9, wherein the switching/CTI server changes a virtual telephone number to an idle virtual telephone number when a request of changing the virtual telephone number stored in the database is received through a communication network.

13. The system as claimed in claim 9, wherein the database includes available term fields, each of which is assigned to respective one of the at least one or more virtual telephone numbers, and

the switching/CTI server generates an available term exceeding message when an available term field of the dialed virtual telephone number is activated and provides the available term exceeding message to a calling party, which had dialed the dialed virtual telephone number.

14. The system as claimed in claim 9, wherein the database includes calling party number changing fields, each of which is assigned to respective one of the at least one or more virtual telephone numbers, and

the switching/CTI server changes a calling party number to the dialed virtual telephone number when a calling party number field of the dialed virtual telephone number is activated, and provides the dialed virtual telephone number as the calling party number to a called party.

FIG.1

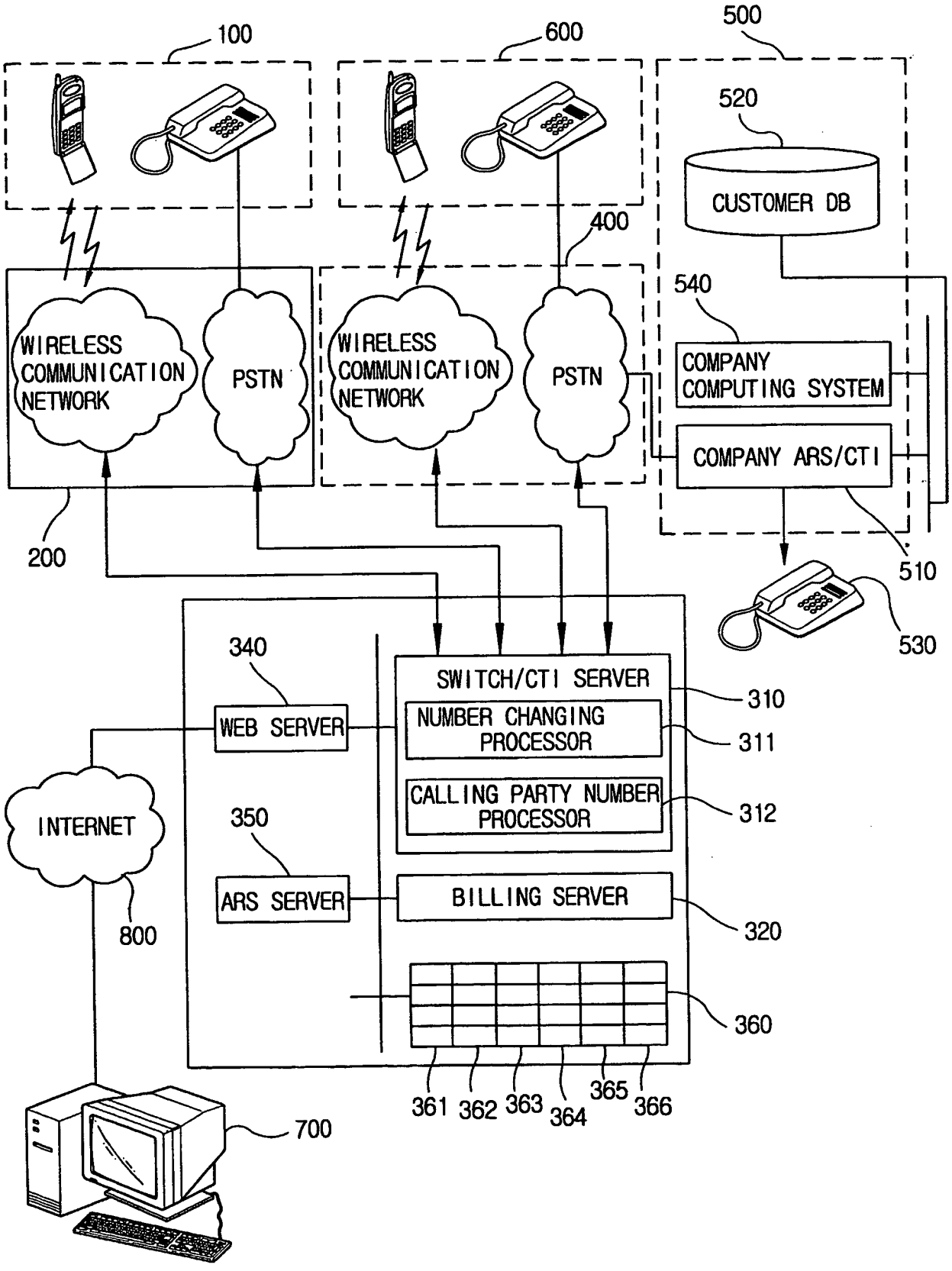
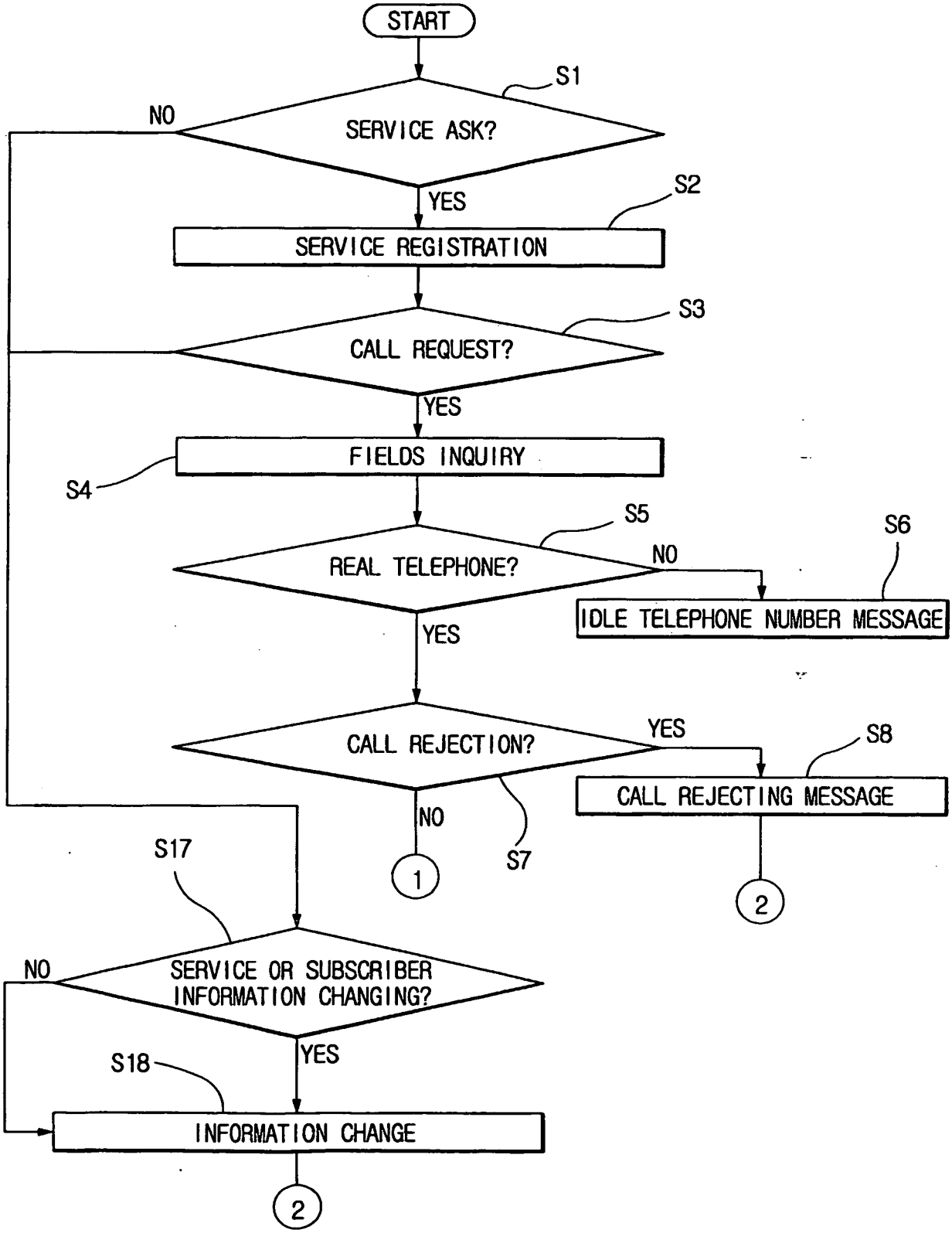


FIG.2


START
S1
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YES
S2
SERVICE REGISTRATION
S3
CALL REQUEST?
YES
FIELDS INQUIRY
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REAL TELEPHONE?
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S6
IDLE TELEPHONE NUMBER MESSAGE
YES
CALL REJECTION?
YES
S8
CALL REJECTING MESSAGE
NO
S7
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2
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SERVICE OR SUBSCRIBER INFORMATION CHANGING?
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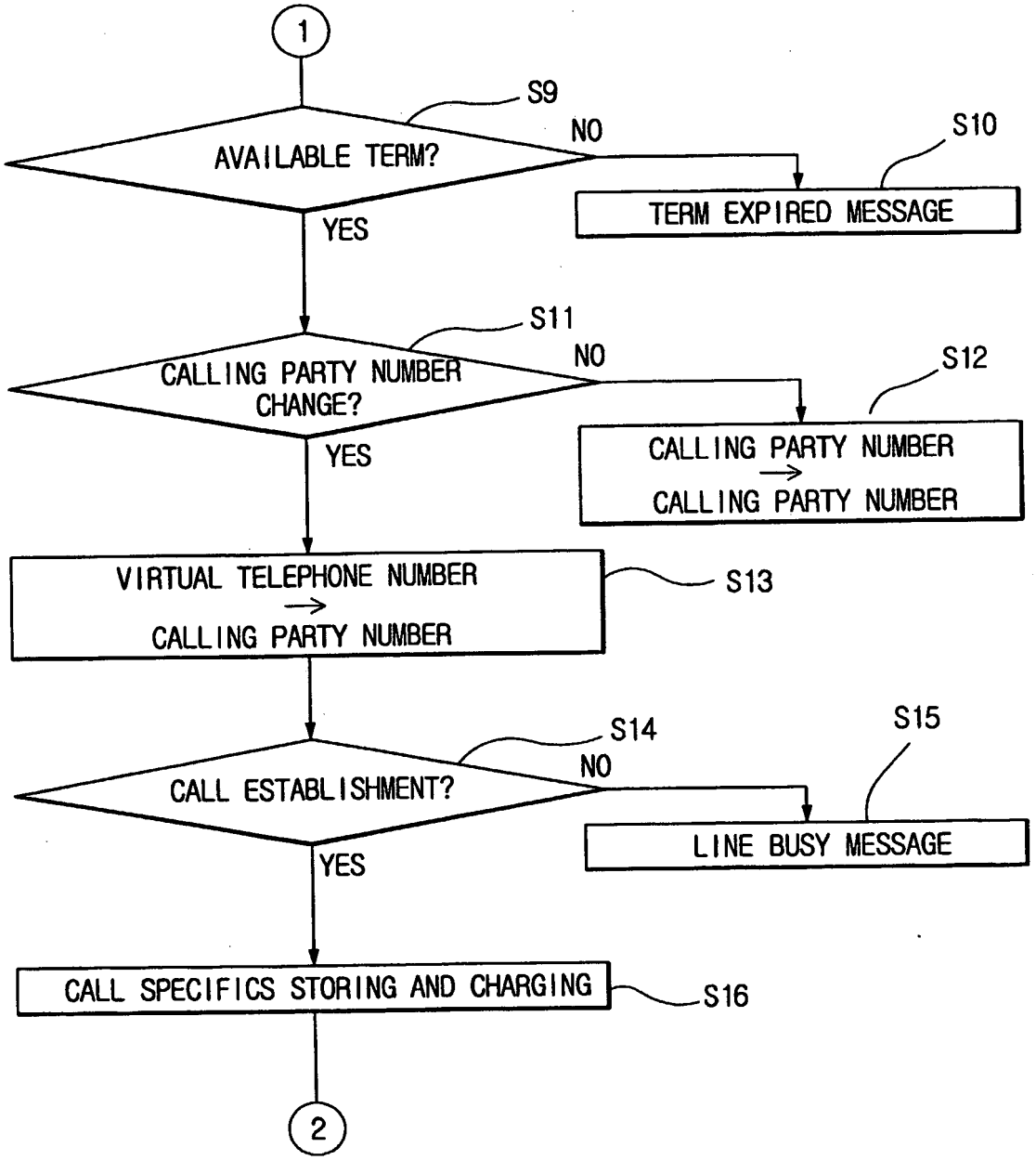
INFORMATION CHANGE
2

3/3

FIG.3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR02/00586

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04M 3/51

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC7 H04M 3/51, 1/57, 3/42

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPI, PAJ "telephone <near>number<and>receiv*<near>reject*"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 844773 A3 (Cybiotronics, Inc. Quarry Bay, Hong Kong) May.27,1998 * The whole document	1-3
A	JP 10-164185 A(MEISEI ELECTRIC CO. LTD) Jun.19,1998 * The whole document	1-3
A	JP 11-341142 A(YILI ELECTRIC IND CO LTD) Dec.10,1999 * The whole document	1-3
A	JP 12-324229 A(NEC CORP.) Nov.24,2000 * The whole document	1-3
A	JP 07-66868 A(NIPPON TELEGR & TELEPH CORP <NTT>) Mar.10,1995 * The whole document	1-3
A	JP 02-79589 A(NEC ENG LTD) Mar.20,1990 * The whole document	1-3

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA/KR	Authorized officer
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